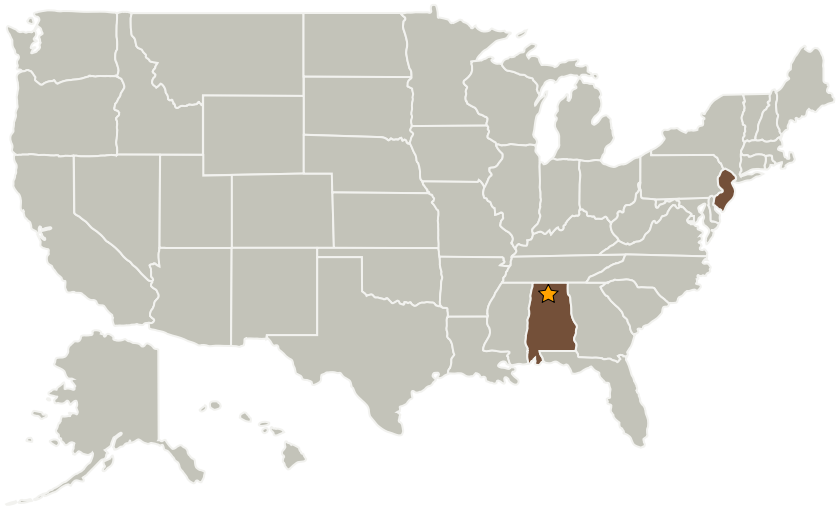
Silicone Adhesives for High Temperature Inflatable Fabrics and Polymer Films, Phase I

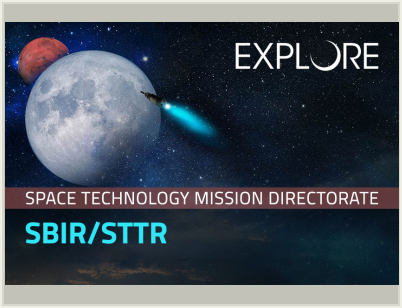
Completed Technology Project (2008 - 2008)

Project Introduction

Thin films, elastomeric materials, high temperature fabrics and adhesives that are capable of withstanding thermal extremes (-130oC to 500oC) are highly desirable for use in inflatable decelerator applications. One solution is to substantially increase the thermal conductivity of the adhesive layer underneath the thin film layer so that heat generated during entry of the decelerator into the atmosphere can be quickly and effectively dissipated, thus avoiding the negative effect of high temperature. We propose an approach wherein a low volume fraction (<5%) of inorganic nanoparticle fillers will lead to substantial increase in thermal conductivity in the direction perpendicular to the thin film. The innovation is in the development and processing of a unique morphology of the nanocomposite adhesive material. In Phase I, we will demonstrate the feasibility of the concept by fabricating elastomeric adhesives containing nanoscale additives, and testing the thermal conductivity perpendicular to the thin film direction. The Phase I program is a collaboration with a leading manufacturer of inflatable structures for space applications. The focus of the Phase II program will be in implementing the technology in a prototype component, which will be tested and qualified, and made available to NASA. The proposed work builds upon NEI's prior experience with nanoparticle dispersed material systems.

Primary U.S. Work Locations and Key Partners





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Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Center / Facility:

Marshall Space Flight Center (MSFC)

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

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Organizations Performing Work	Role	Type	Location
★Marshall Space Flight Center(MSFC)	Lead Organization	NASA Center	Huntsville, Alabama
NEI Corporation	Supporting Organization	Industry Small Disadvantaged Business (SDB)	Piscataway, New Jersey

Primary U.S. Work Locations	
Alabama	New Jersey

Project Management

Program Director:

Jason L Kessler

Program Manager:

Carlos Torrez

Principal Investigator:

Runqing Ou

Technology Areas

Primary:

- TX02 Flight Computing and Avionics
  - TX02.2 Avionics Systems and Subsystems
    - TX02.2.9 Hardware Enabling Secure Avionics